

**"Oregon Weather Service," report prepared by B. S. Pague, Sergeant, Signal Corps:**

**Temperature (in degrees Fahr.).**—At Roseburg the temperature was slightly above the normal and at the other stations slightly below; but at no station has there been any marked departure. The month was well divided into a warm and a cool period, the former extending from the 1st to the 15th, and the latter from the 16th to the end of the month. In general the highest temperature occurred on the 1st, and the lowest on the 25th. The highest reported in the state being 78, at Ashland, the lowest, 1, at La Grande. The mean of the state for the month is 41.

**Precipitation (in inches).**—The most marked feature of the state has been the deficiency in precipitation at all stations, except Albany and Bandon. The deficiency ranges from 3.84 at Portland to 0.80 at Linkville. The precipitation for the season, from July 1st, is most decidedly below the average in all sections of the state, Portland being the most deficient.

**Weather.**—But one general storm passed over the state; it appeared off the coast of Washington Territory on the 27th and rapidly extended to the south. From the 24th to the 28th the weather was unusually cold.

**Winds.**—The winds were variable and light to fresh in force.

**Snow.**—Although it is unusual for snow to fall so early in the season in the interior valleys a light snow was reported in Flounroy Valley, twelve miles west of Roseburg, on the 15th, also again on the 24th. Two inches of snow fell at East Portland on the 26th. Very light snow at Eola on the 23d; on the 24th a few flakes fell at Roseburg, and on the 29th snow fell at "The Dalles" and in the southern part of the state.

**Frosts.**—From the 1st to the 16th occasional frosts occurred, and from the 16th to the end of the month killing frosts occurred in all sections of the state.

**The "Pennsylvania State Weather Service," report prepared under the direction of the Franklin Institute, Philadelphia, by Sergeant T. F. Townsend, Signal Corps, assistant:**

The mean temperature of the state for November was 39°.2, which is about normal. The highest temperature occurred on the 27th, and ranged from 65° at Girardville and Dyberry to 79° at Washington. This extreme was followed by a cold wave on the 29th and 30th, during which the following low temperatures were noted: Wellsborough, 1°; Drifton, 6°; Clarion, 8°; State College, 8°.5; Greenville, 8°.4; Indiana, 9°, and Philadelphia, 25°. This cold wave was general throughout the United States, and low temperatures extended to the southern parts. One of its notable features was its slow progressive easterly movement after reaching the Alleghenies. The greatest daily ranges of temperature during the month occurred about the 2d, and the least daily ranges on the 11th, 15th, and 24th. Until the last of the month the ground was not frozen so as to seriously interfere with ploughing. Frosts were numerous and general. The average rainfall for the state was 1.80 inches, which is but little more than half of the usual quantity for November. The stations reporting the most are, Erie, 4.13 inches; Dyberry, 2.60 inches; Clarion, 2.45 inches; Indiana, 2.44 inches; Wysox and Greenville, each 2.38 inches. The least occurred at Charlesville, 0.90 inch, and Carlisle, 0.96 inch. The dates on which general rains occurred were the 10th, 11th, 14th, 15th, 19th, 20th, 24th, 25th, and 28th.

Much inconvenience has been experienced in many counties from the drought. In Clearfield and Luzerne counties streams and wells are reported very low. In Northumberland the scarcity of water has been severely felt at the collieries. During the entire month the fear of a water famine was gen-

eral in Berks county. Farmers were hauling water in barrels for home use and cattle were driven daily to running streams, often long distances from home. Springs that were never known to fail ceased to flow. It is said that the Schuylkill has not been so low for many years. Much damage has been done throughout several counties by forest fires. Light snows prevailed throughout the state on the 10th, 11th, 19th, 20th, and 30th. The greatest depth reported was six inches at Scranton and Grampian Hills.

The following is an extract from the report of the "Meteorological Department of the State (Tennessee) Board of Health," prepared under direction of J. D. Plunkett, M. D., President of the State Board of Health, by H. C. Bate, Signal Corps, Assistant, Nashville:

The main features of the weather during the month of November were the small amount of rainfall, the almost entire absence of electrical disturbances, the large percentage of clear days, and the smoky atmosphere which prevailed during the second decade. The month taken altogether was remarkably pleasant.

The mean temperature was 47°.1, about the normal for November of the past five years. The highest temperature recorded was 80°, on the 4th, and the lowest, 10°, recorded on the 20th, 21st, and 28th, and was the lowest November minimum since 1883. The highest monthly mean was 62°.6, at Memphis, and the lowest, 32°.8 at Lawrenceburg. The daily ranges of temperature were generally much greater than usual, the greatest being the remarkable range of 61°, on the 27th, at Austin. During the month four cold-wave warnings were received, viz.: 17-18th, 19-20th, 23d-24th, 26-28th, all of which were fully verified, except the warning of the 23d, which did not materialize. There were two cold waves during the month for which no warnings were received, viz.: the 5-6th and 10-11th. In the first the temperature fell 30°, and in the second 27°.

The mean precipitation was 1.57 inches, much below the November normal, and the smallest November mean during the past five years, except in 1884, when it was about the same. Of this amount the eastern division received an average of only 0.75 inch, the middle division receiving a little less than an inch and a half, and the western division a little less than an inch and a half. In the eastern division only two stations reported as much as one inch, while at one station (Parksville) no rain was reported during the month. There were ten days on which a measurable quantity of rain fell. The greatest daily rainfall occurred on the 27th, and was, in most parts of the state, followed immediately by a fall of sleet and snow. The greatest monthly rainfall was 4.06 inches, reported at Memphis, and the greatest daily fall was 1.59 inches, on the 25th, also reported at Memphis, and 1.60 inches on the 26th, at Nunnally. With the exception of the 7th, 9th, 10th, 14th, 23d, 24th, 25th, 26th, 27th, and 28th, no measurable rain or snow fell during the month. There was a very light fall of snow in the western part of middle division on the 20th.

The protracted drought was peculiarly favorable to the extensive forest fires, which prevailed to a greater or less extent over the entire state, but which were particularly prevalent in the western division, doing much damage. These fires caused a densely smoky atmosphere for more than a week, culminating on the 19th, when it was so dense that it became painful to the eyes and rendered breathing disagreeable. This day will long be remembered as the "smoky day." The cold wave which came on the 20th cleared the atmosphere.

Prevailing winds, north and east.

## NOTES AND EXTRACTS.

### RAIN AND SNOW FROM CLOUDLESS SKY.

[By Junior Professor T. RUSSELL, Signal Service.]

The 7 a. m. maps of the Signal Service have been examined for the weather conditions prevailing in the vicinities of places where rain or snow from a cloudless sky have been reported. Where the place happens to be a Signal Service station the rainfall during twenty-four hours at the place is always small, rarely exceeding 0.03 inch. But it does not follow that all of that very small amount fell from a cloudless sky. There may have been other rainfalls during the day. The maps almost invariably show rain or snow in the vicinities of these places at 7 a. m. More than half the cases were found to occur on the southwest side of an area of low barometer prevailing in some part of the country at the time, and at a distance of about 500 miles from its centre. In many cases where snow has been reported winds were sometimes as high as twenty-five miles per hour. As there has always been snow in the vicinities of the places, presumably from cloudy skies, this suggests that the snowfall from a cloudless sky may sometimes be snow carried in the upper air from a place where it is cloudy. Some of the cases of snow occur in areas of high barometer with light winds. In these the isothermal lines on the map are usually crowded in the vicinity of the place. Nine out of the eighty-one cases occurred at Burlington, Vt. This might be taken to indicate that the observer there takes a special interest in that class of occurrences and watches for them closely. Probably rain or snow from cloudless sky is a frequent occurrence at many places, but passes unnoticed.

It would seem as if rain or snow from a cloudless sky might occur at any time when a considerable volume of warm air saturated with moisture ascended and mixed with cooler air above, also saturated. Air mixing in this way, a

fog or cloud would be formed which might disappear before the rain or snow reached the earth. The transition from cloud to rain would depend on the rapidity of mixing, and this would be greater, the greater the difference in temperature of the mixing volumes of air. A warm current of air above a cold one, if both were saturated, might cause a fall of rain without perceptible formation of cloud. The tendency of the clouds to mix would be caused by the friction of the currents on each other and the diffusion of moisture from the warmer to the colder current where it solidifies or liquifies. Ordinarily in the formation of cloud and rain the warm current is near the surface of the earth and the tendency to mix, which is caused by a difference in density, goes on through a great thickness of air as the warm currents ascend. The rainfall from a cloudless sky is always small. It would require mixing throughout a layer of air seventy feet thick and a reduction in its temperature from 80° Fahr. to 60° Fahr. at saturation to produce 0.01 inch of rainfall. But a fall of 0.002 inch of rain, lasting half a minute, would be very perceptible to a person out of doors, while not measurable with the ordinary rain-gauges in use. A much smaller amount of precipitation in the shape of snow would be very noticeable. One flake of snow to a cubic yard of air for a height of 200 yards for only five seconds would be a conspicuous snow storm, totally inappreciable as depth of rainfall.

Rain from a cloudless sky is frequently observed at Mauritius Island in the tropics. In the far north of the Arctic regions snow without clouds, or fine frost particles, as it is called, occurs almost daily.

In an area of low barometer or cyclone the rainfall extends principally in front, or to the east of the lowest barometer, and only a short distance back of it. The circulation of winds in a cyclone at the earth's surface is around the lowest barometer, contrary to the direction of motion of the hands of a

watch, and incurved towards the centre of the cyclone. In the upper air the motion is outcurved from the centre. Most of the rainfall in a cyclone comes down within a few miles of where it is formed in front of the lowest barometer. The farther back of the low area the thinner the veil of cloud. As most of the cases of rain or snow from cloudless skies occur on the southwest side of an area of low barometer the places where this occur may be the limiting line of rainfall in the cyclone and it may really be from cloud, but so thin as to be imperceptible, or so small in quantity as to have disappeared by the time the rain reaches the ground.

Table of monthly and annual mean temperatures at Hopkinton, Iowa, from January, 1852, to November, 1887, inclusive, from observations of Theodore Marks.

| Year.   | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | Annual mean. |
|---------|----------|-----------|--------|--------|------|-------|-------|---------|------------|----------|-----------|-----------|--------------|
| 1852... | 21       | 29        | 34     | 42     | 61   | 70    | 76    | 71      | 51         | 54       | 30        | 21        | 47.5         |
| 1853... | 20       | 21        | 34     | 47     | 58   | 73    | 71    | 74      | 65         | 49       | 38        | 25        | 48.5         |
| 1854... | 16       | 28        | 41     | 53     | 66   | 70    | 76    | 73      | 68         | 57       | 39        | 28        | 50.8         |
| 1855... | 24       | 19        | 31     | 56     | 63   | 68    | 73    | 70      | 66         | 49       | 39        | 20.5      | 49.1         |
| 1856... | 10       | 18        | 26     | 50     | 60.5 | 74    | 76    | 69      | 61         | 53       | 34        | 15        | 45.5         |
| 1857... | 10       | 28        | 30     | 34     | 56   | 68    | 74    | 69      | 65         | 50       | 31.5      | 33        | 45.8         |
| 1858... | 32       | 20        | 41     | 47     | 56   | 72    | 74    | 71      | 65         | 52       | 33        | 24        | 49           |
| 1859... | 21       | 26        | 41     | 43     | 63   | 66    | 76    | 72      | 63         | 49       | 40        | 15        | 48           |
| 1860... | 22       | 27        | 43     | 51     | 65   | 70    | 75    | 70      | 60         | 53       | 36        | 21        | 49.5         |
| 1861... | 17       | 23        | 34     | 51     | 56   | 71    | 71    | 72      | 62         | 52       | 36        | 30        | 48.7         |
| 1862... | 16       | 17        | 34     | 43     | 61   | 68    | 73    | 70      | 62         | 51       | 34        | 28        | 46.7         |
| 1863... | 27       | 24        | 33     | 50     | 61   | 66    | 70    | 69      | 62         | 45       | 35        | 24        | 47.5         |
| 1864... | 17       | 24        | 32     | 46     | 60   | 68    | 73    | 70      | 63         | 46       | 34        | 16        | 45.8         |
| 1865... | 17.3     | 28.3      | 31     | 46     | 60   | 69    | 77.8  | 71.3    | 65.5       | 50       | 40.7      | 19.7      | 47.5         |
| 1866... | 18       | 19        | 29.3   | 50     | 59   | 66    | 74    | 66      | 57.7       | 52.5     | 38.5      | 21.3      | 46           |
| 1867... | 14.7     | 24        | 25     | 45     | 50.3 | 63    | 72    | 73.5    | 66         | 54       | 42.5      | 23.5      | 46.7         |
| 1868... | 12       | 22        | 39     | 43     | 62   | 69    | 80    | 67      | 57         | 49.7     | 38        | 21        | 46.7         |
| 1869... | 28.7     | 27        | 30     | 47     | 59.3 | 66    | 71    | 72.5    | 62.5       | 43.7     | 33        | 27        | 47.2         |
| 1870... | 22.3     | 25        | 30.5   | 52     | 65.7 | 72    | 77.3  | 71      | 67         | 55       | 41.3      | 24.3      | 50.2         |
| 1871... | 22.3     | 28.3      | 39.7   | 52.7   | 65   | 72    | 74    | 73.7    | 62.3       | 54.3     | 32        | 17.7      | 48.7         |
| 1872... | 19.7     | 24.3      | 29     | 50.3   | 60   | 71.3  | 74.3  | 73      | 64         | 52.3     | 30.5      | 15.3      | 47           |
| 1873... | 14       | 18.3      | 34     | 45     | 59   | 73    | 72.3  | 74.7    | 60.3       | 47       | 32        | 27        | 46.7         |
| 1874... | 21.7     | 27        | 33     | 41     | 64.7 | 71    | 77    | 75      | 65         | 53.5     | 35        | 26        | 49.2         |
| 1875... | 7        | 8.5       | 29     | 47.3   | 61.5 | 67.3  | 74    | 71.3    | 63.7       | 49.5     | 35.5      | 32.7      | 45.5         |

Table of monthly and annual mean temperatures at Hopkinton, Iowa—Con.

| Year.   | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | Annual mean. |
|---------|----------|-----------|--------|--------|------|-------|-------|---------|------------|----------|-----------|-----------|--------------|
| 1876... | 27       | 28        | 30     | 49     | 61.7 | 68.7  | 74.3  | 74.7    | 62.3       | 49.5     | 34        | 14.5      | 48           |
| 1877... | 15.7     | 36        | 27     | 48.7   | 61.7 | 65    | 74    | 73      | 68         | 53       | 35        | 41.7      | 50           |
| 1878... | 28       | 36.3      | 43     | 55     | 57.5 | 68    | 78    | 76      | 67.5       | 51.5     | 41        | 18.7      | 52           |
| 1879... | 15.3     | 21        | 36     | 49     | 62.7 | 68    | 75    | 71      | 66         | 59       | 36        | 19.7      | 47.7         |
| 1880... | 31       | 28        | 34     | 47     | 66   | 70    | 72    | 72      | 61         | 49       | 26        | 17        | 47.7         |
| 1881... | 11       | 17        | 29     | 43     | 67   | 67    | 74    | 75      | 66         | 49       | 34        | 31        | 48           |
| 1882... | 21       | 34        | 35     | 48     | 53   | 67    | 68    | 71      | 69         | 56       | 38        | 21        | 48.3         |
| 1883... | 7        | 15        | 29     | 49     | 54   | 67    | 72    | 70      | 59         | 47       | 36        | 24        | 44           |
| 1884... | 11       | 19        | 30     | 47     | 61   | 68    | 70    | 68      | 67         | 54       | 36        | 18        | 45.7         |
| 1885... | 8        | 10        | 28     | 45     | 56   | 68    | 74    | 67      | 62         | 47       | 37        | 24        | 44           |
| 1886... | 11       | 21        | 32     | 51     | 61   | 69    | 75    | 74      | 64         | 55       | 34        | 16        | 47           |
| 1887... | 10       | 21        | 33     | 50     | 65   | 71    | 76    | 70      | 61         | 46       | 34        | .....     | .....        |
| Means.  | 17.9     | 23.4      | 33.1   | 47.7   | 60.4 | 69.1  | 73.7  | 71.4    | 63.5       | 49.5     | 35.5      | 22.9      | 47.6         |

Table of monthly precipitation at Oswego, Ill., from January, 1880, to November, 1887, inclusive, from observations of John S. Seely.

| Month.    | 1880.   | 1881.   | 1882.   | 1883.   | 1884.   | 1885.   | 1886.   | 1887.   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Inches.   | Inches. | Inches. | Inches. | Inches. | Inches. | Inches. | Inches. | Inches. |
| January   | 3.84    | 1.44    | 1.20    | 1.68    | 0.73    | 2.14    | 2.94    | 2.98    |
| February  | 3.84    | 3.72    | 3.00    | 5.05    | 2.61    | 1.37    | 1.68    | 4.29    |
| March     | 1.64    | 3.60    | 3.00    | 0.63    | 2.00    | 0.14    | 3.17    | 0.80    |
| April     | 4.92    | 1.44    | 5.82    | 3.68    | 2.34    | 2.87    | 4.04    | 0.48    |
| May       | 6.72    | 1.68    | 4.80    | 6.49    | 2.44    | 2.48    | 3.85    | 2.78    |
| June      | 3.36    | 5.88    | 6.64    | 3.35    | 3.16    | 4.92    | 2.17    | 0.29    |
| July      | 6.00    | 3.36    | 3.60    | 3.37    | 5.95    | 3.42    | 0.33    | 1.21    |
| August    | 6.84    | 0.30    | 5.28    | 0.54    | 3.27    | 0.22    | 4.27    | 3.48    |
| September | 2.88    | 3.84    | 1.44    | 1.26    | 3.04    | 4.02    | 4.53    | 2.70    |
| October   | 2.04    | 7.20    | 2.72    | 6.60    | 5.03    | 3.71    | 1.20    | 2.34    |
| November  | 1.20    | 5.04    | 1.86    | 4.81    | 1.62    | 1.63    | 0.86    | 1.78    |
| December  | 0.00    | 2.93    | 2.10    | 1.25    | 3.95    | 2.51    | 1.01    | .....   |
| Annual    | 43.28   | 39.23   | 41.36   | 38.71   | 36.16   | 35.43   | 30.05   | .....   |

Table showing monthly and annual precipitation (in inches and hundredths) at Newark, N. J., from May, 1843, to December, 1887, from observations of Mr. Frederick W. Ricord.

| Year. | January. | February. | March. | April. | May.   | June.  | July.  | August. | September. | October. | November. | December. | Annual.  |
|-------|----------|-----------|--------|--------|--------|--------|--------|---------|------------|----------|-----------|-----------|----------|
| 1843  | .....    | .....     | .....  | 0.39   | 0.85   | 1.59   | 2.28   | 22.48   | 3.61       | 5.90     | 3.92      | 4.14      | .....    |
| 1844  | 4.98     | 1.54      | 4.78   | 1.27   | 0.85   | 2.56   | 5.82   | 2.08    | 2.97       | 5.51     | 2.04      | 3.87      | 37.49    |
| 1845  | 3.37     | 4.21      | 3.76   | 1.27   | 2.55   | 3.40   | 2.17   | 4.80    | 2.45       | 2.25     | 2.87      | 3.73      | 36.43    |
| 1846  | 5.12     | 4.16      | 3.41   | 3.26   | 8.74   | 2.17   | 4.73   | 4.10    | 0.55       | 2.81     | 8.74      | 3.74      | 51.53    |
| 1847  | 4.65     | 6.07      | 4.14   | 0.85   | 3.15   | 6.25   | 3.30   | 2.89    | 11.30      | 3.46     | 2.84      | 5.91      | 54.81    |
| 1848  | 1.82     | 1.81      | 2.39   | 1.33   | 5.98   | 6.00   | 2.06   | 0.95    | 2.19       | 4.76     | 2.94      | 4.54      | 36.73    |
| 1849  | 0.64     | 2.69      | 4.85   | 0.92   | 4.23   | 1.09   | 2.36   | 8.08    | 1.60       | 0.93     | 2.18      | 4.47      | 39.84    |
| 1850  | 5.08     | 3.05      | 4.17   | 3.03   | 7.43   | 3.53   | 7.42   | 4.72    | 4.40       | 1.72     | 1.52      | 5.11      | 51.18    |
| 1851  | 2.01     | 4.50      | 3.97   | 6.09   | 3.93   | 1.10   | 6.43   | 1.52    | 0.62       | 3.66     | 4.61      | 1.93      | 40.37    |
| 1852  | 2.92     | 2.20      | 4.80   | 5.21   | 3.67   | 1.72   | 2.53   | 4.16    | 0.74       | 2.17     | 5.84      | 7.64      | 44.70    |
| 1853  | 3.09     | 5.22      | 3.14   | 5.01   | 4.67   | 3.65   | 3.25   | 11.22   | 5.03       | 5.08     | 3.67      | 4.31      | 52.31    |
| 1854  | 1.79     | 5.02      | 1.87   | 4.27   | 4.17   | 2.10   | 3.28   | 1.12    | 3.96       | 2.44     | 4.61      | 1.63      | 36.46    |
| 1855  | 4.03     | 3.47      | 2.00   | 2.57   | 2.36   | 4.52   | 4.47   | 4.16    | 2.25       | 5.26     | 2.99      | 6.50      | 44.25    |
| 1856  | 3.37     | 1.25      | 2.00   | 2.57   | 4.31   | 3.12   | 1.41   | 5.70    | 2.66       | 1.40     | 0.87      | 3.48      | 34.08    |
| 1857  | 3.83     | 1.50      | 1.99   | 7.15   | 6.03   | 5.34   | 5.08   | 4.01    | 3.81       | 3.95     | 4.78      | 4.26      | 49.34    |
| 1858  | 3.40     | 1.01      | 3.85   | 4.99   | 4.99   | 4.65   | 2.99   | 4.21    | 1.41       | 3.01     | 4.78      | 4.26      | 47.05    |
| 1859  | 6.88     | 3.80      | 6.88   | 5.30   | 2.55   | 3.94   | 4.02   | 6.26    | 6.98       | 3.05     | 4.78      | 5.20      | 57.31    |
| 1860  | 2.32     | 2.71      | 1.22   | 2.51   | 5.00   | 1.81   | 2.72   | 6.23    | 5.65       | 2.83     | 6.71      | 3.42      | 43.13    |
| 1861  | 4.46     | 1.88      | 4.91   | 4.92   | 5.19   | 2.60   | 1.12   | 3.97    | 3.26       | 2.12     | 4.45      | 1.85      | 43.58    |
| 1862  | 5.41     | 3.69      | 3.99   | 3.21   | 3.04   | 6.60   | 3.02   | 3.00    | 2.12       | 4.26     | 4.45      | 4.57      | 44.64    |
| 1863  | 4.27     | 4.25      | 5.25   | 5.83   | 4.49   | 5.28   | 3.95   | 4.97    | 1.30       | 3.44     | 3.95      | 4.76      | 45.97    |
| 1864  | 1.73     | 0.82      | 3.14   | 3.67   | 5.28   | 1.85   | 3.21   | 4.68    | 4.21       | 4.68     | 3.30      | 4.38      | 38.43    |
| 1865  | 4.09     | 4.57      | 4.89   | 3.34   | 5.73   | 3.48   | 6.73   | 3.93    | 3.47       | 3.97     | 2.91      | 2.91      | 39.93    |
| 1866  | 1.75     | 5.07      | 1.82   | 2.82   | 4.40   | 2.59   | 1.84   | 5.34    | 1.23       | 4.62     | 1.94      | 2.04      | 54.69    |
| 1867  | 1.61     | 5.64      | 4.39   | 2.57   | 6.55   | 9.74   | 3.75   | 10.61   | 1.23       | 8.95     | 4.37      | 3.84      | 56.81    |
| 1868  | 3.27     | 1.62      | 2.17   | 5.25   | 6.92   | 5.80   | 8.53   | 1.55    | 2.54       | 6.82     | 3.08      | 5.43      | 47.91    |
| 1869  | 4.72     | 5.05      | 4.67   | 1.15   | 4.67   | 5.84   | 3.69   | 1.33    | 9.95       | 2.43     | 2.86      | 2.81      | 47.87    |
| 1870  | 3.03     | 3.04      | 4.99   | 3.68   | 1.99   | 3.12   | 6.96   | 3.09    | 2.79       | 4.75     | 2.46      | 2.17      | 49.41    |
| 1871  | 1.84     | 3.03      | 3.88   | 3.74   | 3.95   | 7.10   | 4.14   | 5.31    | 1.99       | 3.24     | 3.99      | 4.77      | 49.03    |
| 1872  | 5.82     | 3.88      | 2.76   | 5.83   | 3.07   | 4.27   | 8.94   | 7.76    | 3.24       | 3.11     | 4.77      | 2.47      | 52.55    |
| 1873  | 5.67     | 3.16      | 2.13   | 8.71   | 3.75   | 3.58   | 66.1   | 2.78    | 3.55       | 3.74     | 4.67      | 2.86      | 50.10    |
| 1874  | 3.31     | 2.40      | 3.82   | 3.13   | 2.75   | 3.58   | 4.23   | 2.78    | 9.95       | 2.43     | 2.87      | 2.61      | 44.48    |
| 1875  | 3.31     | 5.35      | 10.00  | 3.30   | 1.59   | 2.33   | 5.98   | 10.21   | 1.93       | 7.50     | 4.30      | 2.51      | 45.29    |
| 1876  | 1.20     | 1.65      | 6.07   | 3.12   | 3.04   | 1.58   | 3.06   | 7.73    | 2.45       | 7.73     | 6.91      | 0.92      | 49.82    |
| 1877  | 3.06     | 4.06      | 3.63   | 1.73   | 4.20   | 4.17   | 5.98   | 8.06    | 2.53       | 2.83     | 4.57      | 7.47      | 53.27    |
| 1878  | 6.52     | 2.53      | 3.74   | 4.98   | 2.17   | 3.03   | 5.05   | 9.12    | 3.75       | 0.32     | 5.33      | 4.83      | 44.83    |
| 1879  | 2.89     | 2.83      | 4.90   | 3.30   | 0.76   | 1.18   | 5.02   | 4.68    | 2.68       | 2.10     | 2.68      | 37.32     | 39.00    |
| 1880  | 2.59     | 4.64      | 6.63   | 1.71   | 2.91   | 5.04   | 1.34   | 0.98    | 0.87       | 2.73     | 3.07      | 4.53      | 37.32    |
| 1881  | 5.05     | 4.73      | 3.19   | 2.01   | 5.69   | 4.47   | 1.31   | 17.66   | 2.00       | 2.77     | 1.94      | 51.70     | 51.70    |
| 1882  | 5.80     | 4.92      | 2.00   | 4.65   | 4.77   | 4.95   | 2.76   | 4.74    | 5.32       | 2.00     | 2.72      | 42.57     | 42.57    |
| 1883  | 3.71     | 4.14      | 5.63   | 2.66   | 3.35   | 4.95   | 5.28   | 0.23    | 5.39       | 5.32     | 2.99      | 5.90      | 47.83    |
| 1884  | 5.16     | 1.43      | 2.03   | 2.03   | 3.03   | 1.39   | 3.11   | 5.98    | 5.10       | 4.47     | 4.77      | 3.10      | 42.59    |
| 1885  | 3.33     | 4.67      | 3.95   | 4.12   | 7.13   | 3.19   | 4.78   | 1.57    | 1.63       | 2.91     | 4.86      | 4.25      | 48.07    |
| 1886  | 4.96     | 5.43      | 3.62   | 3.17   | 5.80   | 7.00   | 7.05   | 3.23    | 2.39       | 2.53     | 4.82      | 50.61     | 50.61    |
| 1887  | 3.63     | .....     | .....  | .....  | .....  | .....  | .....  | .....   | .....      | .....    | .....     | .....     | .....    |
| Sums  | 160.77   | 158.59    | 167.71 | 155.18 | 178.55 | 160.71 | 192.50 | 228.05  | 168.77     | 160.94   | 163.26    | 171.47    | 2,021.73 |